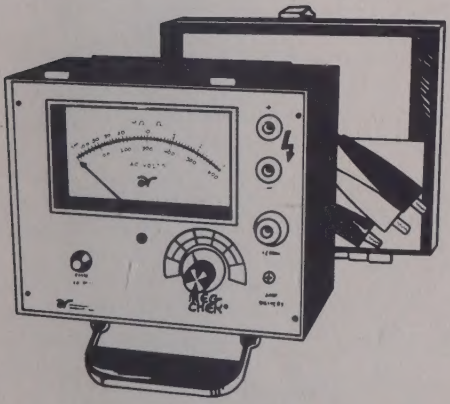
MEG-CHEK®



2002A

OWNERS MANUAL

ASSOCIATED RESEARCH, INC.

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CHARACTERISTICS AND PERFORMANCE

The MEG-CHEKS covered in this manual, both battery and hand crank powered, are all electronic state-of-the-art technology for long trouble free service. Most can be operated from a 115 volt 50/60 HZ line when the line adaptor is used.

The high voltage switching power supply for MEGOHMS is a transformer coupled DC to DC converter, controlled by a Regulating Pulse Width Modulator. All control circuitry, the oscillator, error amplifier, pulse width modulator, transistor output switches, etc. are contained on one IC. A voltage regulator maintains a constant input voltage to the control systems to compensate for battery aging or cranking speed. The amplifier samples power supply output voltage thru a feed-back system and maintains output regulation within .25% from no load (open-circuit)to full load (short-circuit), by controlling the pulse width.

For measuring low values of resistance, the OHMS measuring system receives power directly from the voltage regulator, maintaining regulation within .2% from no load to full load.

Meter zeroing is automatic on all ranges and needs no adjustment. Through use of precision range resistors, a linear DC meter movement and a highly regulated power supply, superior meter tracking accuracy is achieved.

On battery powered units, battery voltage is compared to the regulator voltage and when battery life nears its end, a flashing LOW BATTERY indicator warns the operator, with sufficient lead time, that the batteries need replacing. If ignored, when battery voltage drops to a point where the regulator begins to lose control, an under voltage shut-down system turns the power supply off and no reading can be taken. However, it is strongly recommended that the batteries be replaced as soon as possible once there is a warning of weak batteries. On generator powered units, generator voltage is compared to the regulator voltage and when the generator is being cranked too slow, a flashing LOW RPM indicator warns the operator. In all cases, this assures against incorrect readings since lack of regulation would disturb calibration of meter zero.

Most models have AC voltage measuring systems, some have capabilities of measuring DC voltage also. The AC voltage measuring system is average responding with the scale calibrated in RMS. Input impedance is approximately 100K Ohms for both the AC and DC measuring system.

For safety, a bleeder resistor is automatically connected across the test terminals through an output shorting system when the TEST switch is released, or when generator cranking is stopped. This discharges the test item capacitance when the test is complete.

A guard circuit arrangement on the circuit board reduces surface leakage influence on the reading and augments accuracy.

SAFETY

Before preparing for a test and before operating the equipment, observe all safety rules. Be sure that safety gear is available and in good condition. When switches or breakers are opened for a test, be sure they are locked out or guards and safety signs are posted. Always test the disconnected circuit or apparatus for presence of voltage. Remember that it is possible for voltage to be induced in the disconnected circuits from proximity to other high voltage equipment. Always apply a ground to the disconnected circuits before and after a test to prevent static charges. Use rubber gloves when connecting test leads and when using the MEG-CHEK. Remember, the MEG-CHEK delivers high voltage and equipment or cables that are highly capacitive can store a dangerous amount of energy after they have been tested. Even though the MEG-CHEK is equipped with an automatic discharge system, always ground the circuit or apparatus after a test is complete and before handling the test leads. **Never** handle the test leads when the power source of the MEG-CHEK is energized.

DO NOT USE THE MEG-CHEK IN AN EXPLOSIVE ATMOSPHERE! A slight sparking of the test leads could occur when connecting or disconnecting, due to any slight capacitive charge on the circuit or apparatus to be tested, as could arcing across faulty insulation.

Never allow any unauthorized personnel in the area when tests are to be performed. Roping off the area and posting warning signs is highly recommended.

PREPARATION FOR TEST

Take equipment or circuits out of service. Use the MEG-CHEK voltmeter system to check between terminals and ground to be sure no voltage is present. The equipment must be completely disconnected from the power source for safety and to prevent serious damage to the insulation resistance test equipment. Power or distribution cables must be disconnected at both ends. In the case of rotating machinery, transformers, switchgears, etc., disconnect all leads, if possible, from the unit to be tested. Inspect the insulation system carefully to determine exactly what will be included in the test. If switches or fuse boxes are left in the circuit, they too will be tested and could influence readings to a marked degree. The more equipment that is included in the circuit, the lower the insulation resistance will be. The true insulation resistance of the apparatus that is desired to be tested may be masked by the parallel influence of other connected equipment.

Where practical, more significant test results will be obtained when each phase is tested separately to ground with all other phases grounded. This also allows testing phase to phase for useful comparison information.

OPERATING INSTRUCTIONS

CAUTION: Make sure that the equipment to be tested is de-energized before attempting to measure its insulation resistance or circuit resistance. If voltage is present when the selector switch is in the OHMS or MEG-OHMS position, the MEG-CHEK may be severely damaged.

Some instruments are battery operated, others employ a hand-crank generator. Most can be operated by a line adaptor furnished with the instrument. To use the line adaptor, simply plug the adaptor miniature phone plug into the receptacle on the instrument and plug the adaptor into a 115 volt outlet. Then follow steps below.

I. TO MEASURE INSULATION RESISTANCE

1. Check for voltage to make sure equipment has been taken out of service and no static charge is present.
2. Set the range selector switch on the proper Megohm range and proper test voltage range, if the instrument is equipped with multiple voltage ranges, for megohm testing.
3. Connect the red and black test leads to the (+) and (-) terminals respectively. Use of GUARD on instruments so equipped is optional.
4. For a circuit or phase to ground test, connect the red test lead to the circuit or phase to be tested and the black lead to ground.

For a circuit to circuit or phase to phase test, connect the red test lead to one circuit or phase and the black test lead to the other circuit or phase.

In both cases it is imperative that the circuit or phases are isolated from ground and from each other.

5. On battery operated units, depress the TEST push button, or on generator operated units, crank the generator at a speed to prevent the LOW RPM light from turning on. Approximately 120 RPM.

   NOTE: If the line adaptor is used on the Generator models, it is only necessary to depress the LINE push button.

6. After appropriate time lapse, depending on type of test, read the insulation resistance on the Megohm scale, multiplied or divided by the factor indicated by the range selector switch.
7. At completion of test, release the TEST button or stop cranking, depending on type of instrument being used, and the output shorting system will discharge the test item. It is good safety practice to additionally ground the circuit with a jumper lead before disconnecting the test leads.

II. TO MEASURE CIRCUIT RESISTANCE

1. Check for voltage to make sure equipment has been taken out of service and no static charge is present.
2. Set the range selector switch on the OHMS range.
3. Connect the red and black test leads to the (+) and (-) terminals respectively.
4. Connect the red test lead to one end of the circuit to be measured and the black lead to the other end.
5. Read the resistance on the OHMS scale multiplied by the scale factor indicated by the range selector switch.
6. When test is complete, release the TEST push button or stop cranking depending on the type of instrument being used.

III. TO MEASURE VOLTAGE (V)

1. Set the range selector switch on the appropriate voltage measuring range. Some instruments are for AC measurements only, others have AC and DC capabilities that require the AC/DC selector switch to also be set for the appropriate function.
2. Connect the red and black test leads to the (+) and (-) terminals respectively.
3. Connect the test leads, observing polarity if measuring DC, to the points where voltage is to be measured. Read the voltage on the Voltmeter scale. Operation of the TEST button or cranking of the generator is not required when measuring voltage.

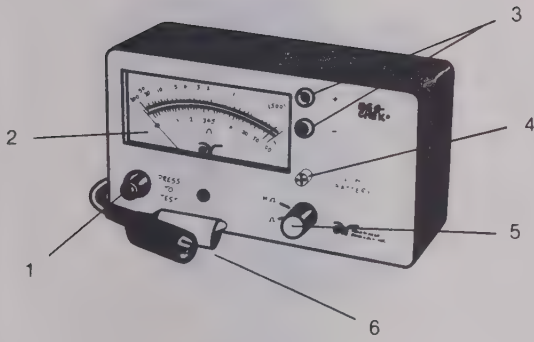
GUARD CIRCUIT

Some instruments are equipped with a GUARD terminal and guard circuit that allows bypassing unwanted leakage current around the metering circuit. Such unwanted leakage current may be due to surface leakage or floating metallic circuits, such as found in a multi-winding transformer or multi-conductor cables, that provide a leakage path due to static charges.

This allows measuring insulation resistance of two specific circuits without influence of other resistive paths.

The GUARD terminal can be connected to electrodes that are in contact with the surface of the insulation. However, these electrodes cannot be connected to the circuits under test, and must be in contact with the insulation only in order to intercept leakage current over the surface.

The GUARD terminal may also be connected to the floating circuits such as transformer windings not being tested, or circuits in a multi-conductor cable not being tested. These windings or circuits must also be isolated from each other and from the windings or circuits under test.



MODEL
2002A

1. Push-To-Test Button
2. Ohm, Meg-Ohm Meter
3. High Voltage & Ground Return Terminals
4. Low Battery Indicator
5. Ohms, Meg-Ohm Selector Switch
6. Test Leads

SPECIFICATIONS:
MEG-CHEK 2002A

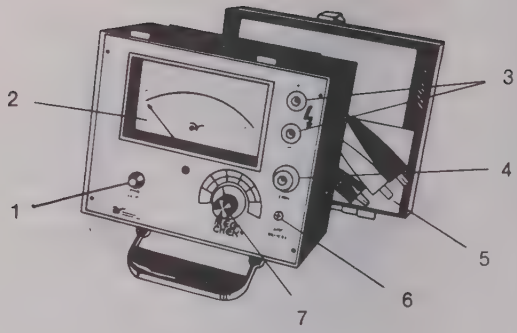
MEASURING RANGES:
Megohm - 100
Ohms - 100
Respective
Test Voltage - 500

CABINETRY:
(H/W/L-inches)
2.25/6.5/3.5
(H/W/L - cm)
5.7/16.6/8.9

POWER SOURCE:
Battery - 6AA Cells

WEIGHT:
LBS - 1.25
KG - .57

ACCURACY:
Megohm ± 1/16" of reading
Ohms ± 1/16" of reading



MODEL 2100A

1. Push-To-Test Button
2. AC Volt, Ohm, Meg-Ohm Meter
3. High Voltage & Return Terminals
4. Guard Circuit Terminals
5. Test Leads
6. Low Battery Indicator
7. Selector Switch, AC Volts, Ohms, Meg-Ohms.

SPECIFICATIONS:
MEG-CHEK 2100A

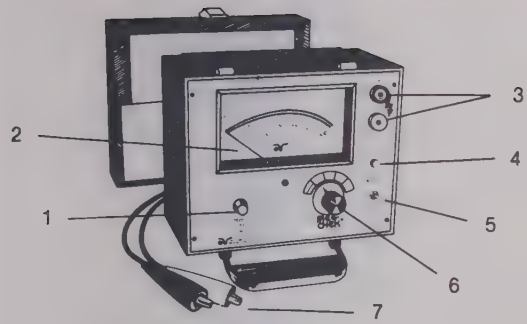
MEASURING RANGES:
Megohm - 200/500/1000/2000
Ohms - 20,000
Respective Test
Voltage - 100/250/500/1000
Volts - measuring - 600 rms

CABINETRY:
(H/W/L - inches)
6.38/7.75/6.25
(H/W/L - cm)
16.2/19.7/15.9

POWER SOURCE:
Battery - 8 D cells
Line Voltage - 115 volts

WEIGHT:
LBS - 7.0
KG 3.17

ACCURACY:
Megohms-ohms ± $1^{1/2}$% of scale length
Volts - ± 3% of full scale



MODEL
2101A

1. Push-To-Test Button
2. AC/DC Volt, Ohm, Meg-Ohm Meter
3. High Voltage & Return Terminal
4. Low Battery Indicator
5. AC/DC Volt Selector Switch
6. Volt, Ohm Meg-Ohm Selector Switch
7. Test Leads

SPECIFICATIONS:
MEG-CHEK 2101A

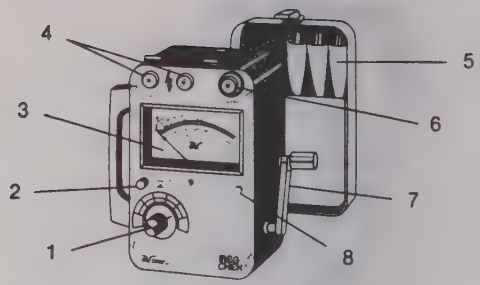
MEASURING RANGES:
Megohm - 200
Ohms - 20,000
Respective Test
Voltage - 500
Volts - measuring - 150/300/600
AC rms & DC

CABINETRY:
(H/W/L-inches)
6.38/7.75/6.25
(H/W/L - cm)
16.2/19.7/15.9

POWER SOURCE:
Battery - 8 D cells
Line Voltage - 115 volts

WEIGHT:
LBS - 7.0
KG - 3.17

ACCURACY:
Megohms-ohms ± 1 1/2% of scale length
Volts - ± 3% of full scale



MODEL
2120A

1. Volt, Ohm, Meg-Ohm Selector Switch
2. Push-To-Test Button Used With Line Adaptor Only
3. Volt, Ohm, Meg-Ohm Meter
4. High Voltage and Return Terminals
5. Test Leads
6. Guard Circuit Terminal
7. Hand Crank
8. Low R.P.M. Indicator

SPECIFICATIONS:
MEG-CHEK 2120A

MEASURING RANGES

Megohm - 200/500/1000/2000
Ohms - 20,000
Respective Test
Voltage - 100/250/500/1000
Volts Measuring - 600 rms

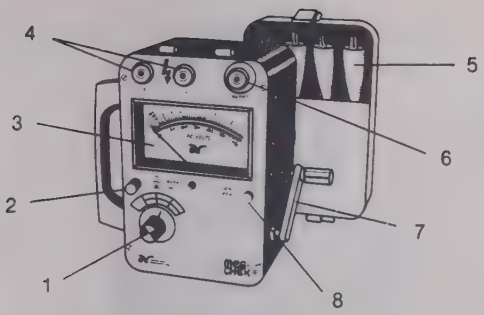
CABINETRY

(H/W/L-inches)
6.5/4.75/7.25
H/W/L/ - cm)
16.5/12.1/18.4

POWER SOURCE
Hand Crank
Line Voltage 115 Volts

WEIGHT:
LBS - 5
KG 2.27

ACCURACY:
Megohm-Ohms - ± $\frac{1}{32}$" of reading
Volts - ± 2% of reading.



MODEL
2021A

1. Volt, Ohm, Meg-Ohm Selector Switch
2. Push-To-Test Button Used With Line Adaptor Only
3. Volt, Ohm, Meg-Ohm Meter
4. High Voltage and Return Terminals
5. Test Leads
6. Guard Circuit Terminal
7. Hand Crank
8. Low RPM Indicator

SPECIFICATIONS:
MEG-CHEK 2021A

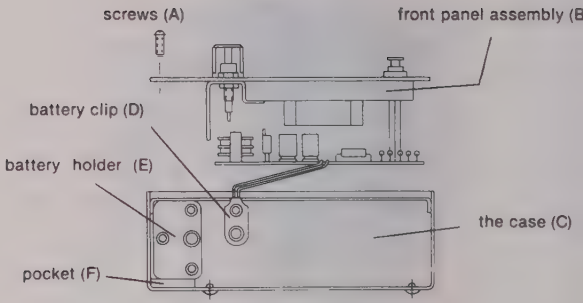
MEASURING RANGES:
Megohm - 100/1000
Ohms - 20,000
Respective Test
Voltage - 500
Volts Measuring - 600 rms

CABINETRY:
(H/W/L-inches)
6.5/4.75/7.25
(H/W/L - cm)
16.5/12.1/18.4

POWER SOURCE:
Hand Crank

WEIGHT:
LBS - 5
KG - 2.27

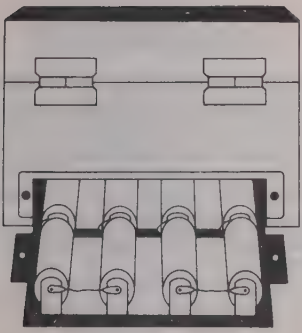
ACCURACY:
Megohm - Ohms ± 1/32" of reading
Volts - ± 2% of reading



MODEL 2002A
INSTRUCTION: BATTERY INSTALLATION

NOTE: Battery holder with 6 "AA" batteries is enclosed in the zippered case.

1. Remove the four black oxide screws (A) from the front panel assembly (B).
2. Carefully lift the front panel assembly (B) out of the case (C).
3. Attach the battery clip (D) onto the battery holder (E).
4. Place the battery holder (E) in its protective pocket (F)
5. Carefully replace the front panel assembly (B) into the case (C)
6. Before replacing the screws, check the following:
   a) Set the selector switch to the Ω range, and depress the Press To Test button. The Ohmeter should read infinity.
   b) Set the selector switch to the MΩ range. Insert the test leads into the Megohmmeter terminals, and short the clips together. Depress the Press To Test button. The Megohmmeter should read Zero.
7. If no deflection of the pointer occurs, open the Megohmmeter and recheck the battery installation.
8. Replace and tighten the four black oxide screws on the front panel assembly.



BATTERY INSTALLATION
MODELS
2100A & 2101A

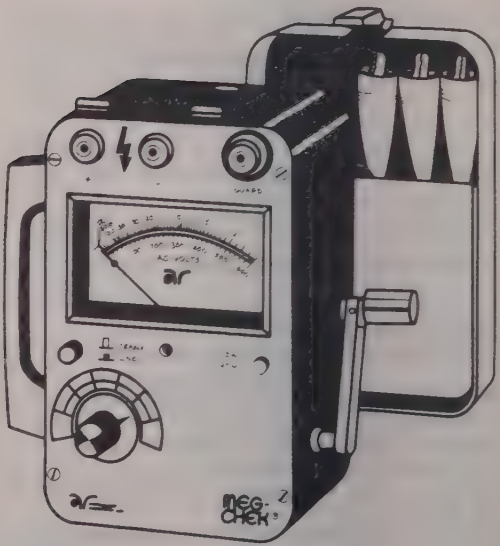
1. Remove the battery tray by turning the two ¼ turn screws located on the back of the unit.
2. Slide the battery tray out.
3. Install the batteries, be certain to observe for proper polarity.
4. Reverse the above procedure to secure the battery tray in place.

OPERATIONAL CHECK:

1. Connect the red and black test leads to the (+) and (−) terminals respectively.
2. Set the range selector switch to the ohms position and connect the test leads together.
3. Press the push-to-test button, the meter pointer should swing up scale to "0".
4. Repeat Step 3 with the selector switch in the megohm position.
5. During this check, or during normal operation, if the low battery indicator remains lit or is flashing, the batteries are weak and should be replaced.

OPERATIONAL CHECK
MODELS 2120A & 2021A

1. Connect the red and black test leads to the (+) and (–) terminals respectively.
2. Set the range selector switch to the ohms position and connect the test leads together.
3. Turn the hand crank at about 120 rpm or until the low rpm indicator light is out. The meter pointer should swing up scale to "0".
4. Repeat Step 3 with the selector switch in the megohm position.



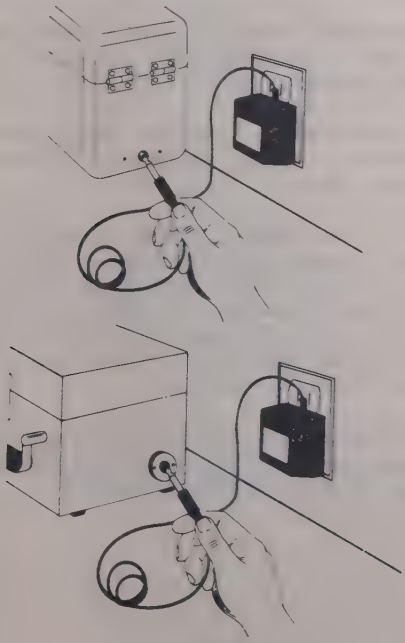
MODELS
2120A, 2100A & 2101A

These MEG-CHEKS® will properly operate with an input voltage between 7.5 and 15 volts DC.

All models except 2002A are supplied with a 115 Volt line adaptor.

On battery operated units, the adaptor can be used when the batteries are low or to conserve battery life.

On hand units the adaptor can be used where the length of the test prohibits cranking.



MEG-CHEK WARRANTY

Models 2002A, 2100A, 2101A, 2120A, 2125A

This new Meg-Chek is warranteed to be free from defects in workmanship and material for two years from the date of shipment, provided there is no evidence of modifications, tampering or physical damage. By-passing any safety systems will void this warranty.

THIS WARRANTY DOES *NOT* COVER TUBES, BATTERIES OR ACCESSORIES NOT OF ASSOCIATED RESEARCH MANUFACTURE.

Any unit found defective under this warranty will be repaired free of charge if returned to the factory *prepaid* and *insured*.

EXCEPT AS PROVIDED HEREIN, ASSOCIATED RESEARCH MAKES NO WARRANTIES TO THE PURCHASE OF THIS UNIT AND ALL OTHER WARRANTIES, EXPRESS OR IMPLIED (INCLUDING, WITHOUT LIMITATION, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE) ARE HEREBY EXCLUDED, DISCLAIMED AND WAIVED.

To avoid delay, before returning the instrument for repair you must first contact Associated Research for authorization and shipping instructions.

Notes:

Notes:

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY CARD

FIRST CLASS PERMIT NO. 12 SKOKIE, ILLINOIS

POSTAGE WILL BE PAID BY

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Skokie, IL 60076

Our Products & Services Include:

Meg-Chek®	—Insulation Resistance Testers
Vibroground®	—Ground Resistivity Testers
Hypot®	—AC & DC High Potential Testers
Hyjoule®	—Primary & Secondary Fault Locators and Tracers
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MA30066

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Manual
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